UNIVERSITY OF CALIFORNIA
COLLEGE OF AGRICULTURE
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AGRICULTURAL EXPERIMENT STATION
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Insecticides and Insect Control.

By H. J. QUAYLE.

1. LIME SULPHUR:

Quicklime, 33 pounds; sulphur, 66 pounds; water, 200 gallons.

Sift sulphur through box with screen bottom into boiling tank with 50 gallons of water. Add the lime and boil 45 minutes to one hour. Stir frequently. Strain through cheese cloth or burlap and dilute to make 200 gallons. If extra lime is desired strain in milk of lime when spray is ready for use.

2. COMMERCIAL LIME SULPHUR:

If of 32° Baumé dilute 1 to 9. If 36° dilute 1 to 11.

Either of the above for San Jose and other armored scales to be applied during dormant season, preferably in early winter or early spring. For Peach Moth, as the buds are expanding in the spring.

3. DISTILLATE 28° to 34° Baumé:

Distillate, 10 to 20 gallons; water, 200 gallons.

For use only with power sprayer with good agitator, which is necessary to make a mechanical mixture of the oil and water.

For the Brown Apricot, Black, and other unarmored scales, and for Woolly Aphis, to be applied during dormant season, preferably in early winter.

4. DISTILLATE POTASH:

Distillate	10 gallons
Lye or caustic soda	5 pounds
Water	200 gallons

Preparation and uses same as under 3. Has the advantage of freeing tree from moss.

5. DISTILLATE EMULSION:

Stock emulsion.

Hot water	12 gallons
Fish oil (see 10) or whale-oil soap	30 pounds
Distillate 30° to 34°	20 gallons

Add soap to hot water in spray tank with agitator going. After soap is dissolved add oil slowly, keeping mixture agitated. Pump out through nozzle at 175 pounds pressure in storage tank.

For use take:

Stock emulsion	11 gallons
Blackleaf 40	1 pint
Water	200 gallons

Place oil emulsion in spray tank, start agitator and add the water. When diluted add the Blackleaf.

For thrips, Black Peach Aphis, and other plant lice.

6. Kerosene Emulsion:

Dissolve ½ pound soap in 1 gallon hot water; add 1 gallon kerosene.

Mix thoroughly with spray pump by turning nozzle back into mixture.

a. For plant lice and other sucking insects during growing season, dilute with 15 to 25 gallons water.

b. For scale insects, Woolly Aphis and other sucking insects during dormant season, dilute with 5 to 10 gallons water.

For use on small scale with hand sprayer.

6*a*. Kerosene Emulsion. *Kitchen formula:*

Dissolve 1 inch cube soap in 1 pint hot water; add 1 pint kerosene. Churn with egg beater.

For growing plants, dilute to 2 or 3 gallons water. For dormant plants, 1 gallon.

7. Miscible Oils:

Commercial preparations of oil so treated as to mix directly with water. Follow directions on container. Uses same as 3, 4, 5, 6, 8, 9, and 10.

8. Straight Kerosene or Water White Oil:

Water white oil (42° Baumé) or kerosene	20 gallons
Water	200 gallons

In use for scale insects of citrus trees.

Application by power outfit. See Bulletin 214.

9. Soap Solution:

Soap, 1 pound; water, 5 to 15 gallons.

Whale-oil or fish-oil soap preferable, but for small amounts any yellow laundry soap will answer.

For plant lice and other sucking insects during summer.

9*a*. Soap Solution. *Kitchen formula:*

1¼ inch cube soap.
1 gallon warm water.

10. Homemade Soap:

Water	6	gallons
Lye (98%)	2	pounds
Fish oil	1½	gallons

Add lye to water in boiler. When dissolved and water boiling, pour in the fish oil, stirring in mean time, and boil slowly for two hours. This will give about 40 pounds soap.

For use dilute with 5 to 15 gallons water for each pound.

For same pests as No. 9.

11. Tobacco or Nicotine:

a. Blackleaf 40 (40% nicotine)	1	pint
Water	200	gallons
b. Tobacco stems	1	pound
Water	4	gallons

Steep stems in 1 gallon warm water and dilute to 4 gallons.

For plant lice and other sucking insects during growing season. For Woolly Aphis and Peach Aphis underground. A liberal solution, or the dry dust in early winter, about the base of the tree, the surface soil first being removed.

12. Tobacco Soap:

Blackleaf 40	1 pound	(1/10 gal.)
Cresol soap	1 gallon	
or		
Whale-oil soap	10 pounds	
Water	200	gallons

The cresol soap requires no heating.

Uses same as 11. Penetrating and wetting power better.

13. Lime Sulphur Tobacco:

Commercial lime sulphur 36°	2.1	gallons
Blackleaf 40	14	fluidounces
Water	200	gallons

For Orange Thrips.

14. Carbolic Lime:

Quicklime	150	pounds
Crude carbolic acid	2	gallons
Water	200	gallons

For Pear Thrips.

15. SULPHUR:

a. Dry. Thoroughly dust over foliage, preferably when moist with dew. Hydrated lime about equal parts with sulfur will increase adhesiveness.

b. Spray. Sulfur, 30 pounds; lime (as milk of lime), 15 pounds; water, 200 gallons.

c. Spray. Commercial lime sulphur, 4 to 5 gallons; water, 200 gallons.

For Red Spiders and Silver Mite. See Bulletin 154.

16. LEAD ARSENATE:

Lead arsenate	6 to 12 ~~gallons~~ pounds
Water	200 gallons

First mix arsenate with 2 or 3 gallons of water.

For Codling Moth and most defoliating insects.

16*a*. LEAD ARSENATE. *Kitchen formula:*

Lead arsenate	1 tablespoonful (1 oz.)
Water	1 gallon

17. PARIS GREEN:

Paris green	1½ to 2 pounds
Water	200 gallons

For Codling Moth and most defoliating insects.

Not to be used along coast or moist situations where injury is likely to result to foliage.

17*a*. PARIS GREEN. *Kitchen formula:*

Paris green	1 teaspoonful (¼ oz.)
Lime	3 teaspoonfuls
Water	2 gallons

18. ZINC ARSENITE:

Zinc arsenite	2 to 6 ~~gallons~~ pounds
Water	200 gallons

A powerful poison for resistant insects, as the Tussock Moth, or for early spraying for Canker Worm and Codling Moth in the dry interior climates.

19*a*. POISONED BAIT. *Kitchen formula:*

Bran	10 pounds
Paris green	1 pound
or	
White arsenic	½ pound
Molasses	½ gallon
Water	2 gallons

Mix paris green with the bran dry. Add the molasses to the water and mix into the bran, making a moist paste.

For Cut Worms and Grasshoppers, distribute a small handful about the base of the vine or tree, or scatter about plants in the garden. May be distributed broadcast for Grasshoppers and Army Worms. See Bulletin 192, p. 123.

19*a*. Poisoned Bait. *Kitchen formula:*

Bran	1 quart
Paris green	1 teaspoonful
Molasses	1 teaspoonful

20. Tree Barriers:

a. Tree Tanglefoot:

A strip a few inches wide surrounding the tree trunk placed in the fall and tended during winter to prevent the ascent of the Canker Worm Moth. Placed in Hop Vines to prevent ascent of Hop Flea Beetle. To bar Argentine Ants or most other insects that reach the foliage by crawling only.

b. Cotton Bands:

A strip four inches wide tied about the tree trunk at the lower edge, and the top then pulled down over the string is in use against Fuller's Rose Beetle on the orange. See Bulletin 214.

c. Mosquito Wire Netting similarly applied is also in use against the Canker Worm.

d. Asphaltum:

A strip 6 to 8 inches wide painted about base of tree trunk to prevent the entrance of the Peach-Tree Borer.

21. Ground Barriers:

A deep furrow with straight side next to the field to be protected will stop the progress of Army Worms. Holes 8 or 10 inches deep and 20 or 30 feet apart may be dug in the furrow. The worms upon falling in these may be killed by pouring in a small amount of gasoline and throwing in a lighted match, or oil, hot water, or other means as seems desirable. See Bulletin 192, p. 127.

22. Carbon Bisulphide:

For treatment of stored products and underground insects.

Usual dosage, 1 pint to 1,000 cubic feet space.

Place liquid in saucers or shallow vessels above material to be treated. Inflammable; avoid lights.

For underground insects, a tablespoonful in holes 3 or 4 feet apart.

23. Hydrocyanic Acid Gas:

Potassium cyanide	1 ounce
Sulphuric acid	3 fluidounces
Water	3 fluidounces

Place water and acid in earthenware vessel and add cyanide. To be used under tents or tight rooms or boxes.

For fumigating buildings or nursery stock, 1 ounce of cyanide to each 100 cubic feet for 1 hour.

For scale insects on citrus trees, maximum or Purple Scale dosage found by multiplying distance around by distance over top of tented tree and pointing off two places. Example:

Distance around		Distance over
40 feet	×	20 feet = 8 ounces cyanide

For Red or Black Scale, reduce one quarter. Example:

Distance around		Distance over
40 feet	×	20 feet = 8. — ¼ = 6 ounces cyanide

See Bulletin 152, and Circulars 11 and 50.

24. Resin Dipping Solution:

Resin	20 pounds
Caustic soda or lye	8 pounds
Fish oil	3 pints
Water	100 gallons

Boil resin and caustic soda in 50 gallons of water for 1 hour. Dilute to 100 gallons.

In use for dipping citrus nursery stock for scale insects and Red Spiders.

Kerosene emulsion and Lime sulphur solution also used for dipping deciduous nursery stock.

25. Kerosene or Crude Oil:

A thin film spread over the surface of a mosquito-breeding pool or container will destroy the wrigglers. For large scale work, the cheaper crude oil may be used and evaporation will occur less rapidly. Four parts of heavy oil 18° to 1 part light oil 30° to 35° gravity will spray readily from nozzles. Drainage or other permanent work should have precedence over temporary treatments. See Bulletin 178.

26. Pyrethrum or Buhach:

Fresh material dusted around floors and walls will reduce the number of fleas and other household insects.

27. Formalin:

A 5 per cent solution of formaldehyde sweetened with sugar and placed in shallow vessels makes a satisfactory fly poison.

Proper disposal of manure and garbage, however, is the basis for house-fly control.

See Bulletin 215.

28. Ant Poison:

Syrup containing between $\frac{1}{4}$ and $\frac{1}{8}$ of one per cent arsenic. A sponge saturated with the arsenic solution and placed in a small fruit jar with perforated cover should be placed where the ants frequent. Carbon bisulphide may be applied to the nests in the ground. See Bulletin 207, p. 81.